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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SONY CORP

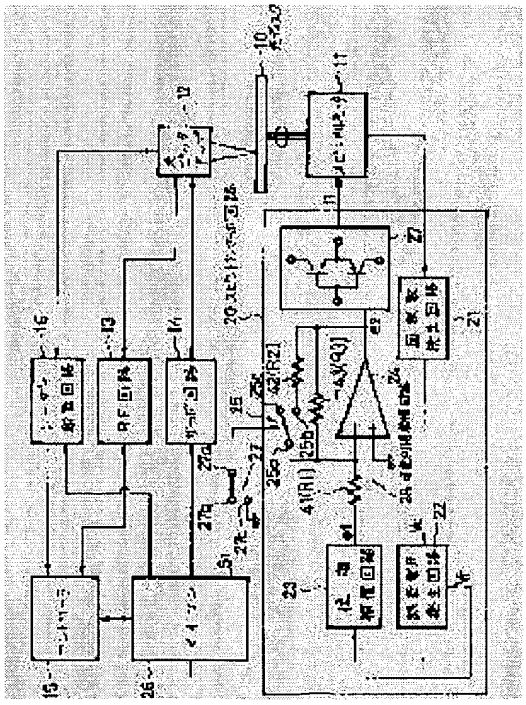
(72)Inventor : OKAWA YOSHIHIRO

(54) OPTICAL DISK DEVICE AND ITS APPLICATION DEVICE

(57)Abstract:

PURPOSE: To restrict max. power consumption as occasion demands.

CONSTITUTION: At the time of starting rotation of a spindle motor 11 where the power consumption becomes max., and at the time of braking the motor from a fixed rotation, a switch 25 is changed by control of a microcomputer 26 for the purpose of restricting a value of a current signal it to be supplied to the spindle motor 11, so as to diminish a gain of a variable gain amplifier circuit 28. By diminishing the gain, the value of the current signal it is restricted. By this method, the max. power consumption can be limited to, for example, half the value. Thus, the power consumption at the time of rising rotation of the spindle motor 11 and/or at the time of falling rotation is variable, thus facilitating the connection of the optical disk device to various systems in different power source capacity and cooling condition.



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CLAIMS

[Claim(s)]
[Claim 1] the optical disk unit carry out [that adjustable carries out in the drive output from the above-mentioned drive circuit to the above-mentioned spindle motor at the time of the rotation standup of the above-mentioned spindle motor, and (or) rotation falling, and it was made having carried out power consumption to adjustable by having the spindle motor made to rotate an optical disk, the drive circuit which drives this spindle motor, and the switch connected to this drive circuit, and changing the above-mentioned switch, and] as the description.
[Claim 2] The optical disk unit according to claim 1 characterized by adjustable [of the current value of the above-mentioned drive output supplied to the above-mentioned spindle motor] being carried out by the change of the above-mentioned switch.
[Claim 3] The optical disk unit according to claim 1 characterized by the current of the above-mentioned drive output supplied to the above-mentioned spindle motor being intermittently supplied by the change of the above-mentioned switch.
[Claim 4] In the optical disk application equipment to which an optical disk unit is connected as a store The power consumption adjustable circuit which carries out adjustable [of the drive output to the above-mentioned spindle motor at the time of the rotation standup of a spindle motor and (or) rotation falling], and carries out adjustable [of the power consumption] to the above-mentioned optical disk unit side is prepared. Optical disk application equipment which establishes the control circuit of the above-mentioned power consumption adjustable circuit in the above-mentioned body side of optical disk application equipment, and is characterized by controlling actuation of the power consumption adjustable circuit by the side of the above-mentioned optical disk unit by actuation of the above-mentioned control circuit by the side of the above-mentioned body of optical disk application equipment.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the optical disk application equipment with which an optical disk unit and its optical disk unit are used as external storage.
[0002]
[Description of the Prior Art] Usually, in optical disk units, such as an optical MAG drive, power consumption becomes max at the time of the rotation standup of the spindle motor made to rotate a disk, and rotation falling. For example, as compared with the time of fixed rotation of a disk, power consumption becomes about about 10 times at the time of the standup of these rotations, and falling.
[0003] So, in the system by which the optical disk unit was incorporated, for example, a jukebox, and the disk autochanger, beforehand, the power-source design according to the maximum above-mentioned power consumption is made, and allowances are given to the power source. Thus, he operates the spindle motor of an optical disk to capacity max, and is trying for the build up time of a system and falling time amount, and the time amount to the so-called performance initiation of the following music to become as short as possible by designing.
[0004] In addition, in such a system, a cooling system is also powerful and the power consumption of an optical disk unit and generation of heat which are incorporated do not become a problem.
[0005]
[Problem(s) to be Solved by the Invention] When connecting with a personal computer (henceforth a personal computer if needed) and using an optical disk unit as an external device in a place, power is supplied to the optical disk unit from the power source of the body of a personal computer.
[0006] In that case, the thing small as much as possible of the power consumption of the power supply of the body of a personal computer and the field of generation of heat to an optical disk unit is desirable.
[0007] This invention is made in view of such a technical problem, and it aims at offering the optical disk unit which can restrict maximum electric power consumption, and its application equipment if needed.
[0008]
[Means for Solving the Problem] this invention optical disk unit For example, the spindle motor 11 made to rotate an optical disk 10 as shown in drawing 1 , By having the drive circuit 27 which drives the spindle motor 11, and the switch 25 connected to the drive circuit 27, and changing a switch 25 adjustable [of the drive output i1 from the drive circuit 27 to the spindle motor 11 at the time of the rotation standup of a spindle motor 11 and (or) rotation falling] is carried out, and it is made to carry out adjustable [of the power consumption].
[0009] In the optical disk application equipment to which, as for this invention optical disk application equipment, an optical disk unit is connected as a store The power consumption adjustable circuit which carries out adjustable [of the drive output to the above-mentioned spindle motor at the time of the rotation standup of a spindle motor and (or) rotation falling], and carries out adjustable [of the power consumption] to the above-mentioned optical disk unit side is prepared. The control circuit of the

above-mentioned power consumption adjustable circuit is established in the above-mentioned body side of optical disk application equipment, the above-mentioned control circuit operates corresponding to the predetermined actuation by the side of the above-mentioned body of optical disk application equipment, and actuation of the power consumption adjustable circuit by the side of the above-mentioned optical disk unit is controlled.

[0010]

[Function] According to this invention optical disk unit, adjustable [of the drive output i1 from the drive circuit 27 to a spindle motor 11] is carried out, and it is made to carry out adjustable [of the power consumption] by connecting a switch 25 to the drive circuit 27 which drives a spindle motor 11, and changing this switch 25.

[0011] for this reason, it becomes possible to make adjustable power consumption at the time of the rotation standup of a spindle motor 11, and (or) rotation falling, and connection of an optical disk unit becomes easy to the various systems by which a power supply differs from cooling conditions.

[0012] moreover, according to the application equipment of this invention optical disk, the power consumption adjustable circuit which carries out adjustable [of the drive output to the above-mentioned spindle motor at the time of the rotation standup of a spindle motor and (or) rotation falling], and carries out adjustable [of the power consumption] to an optical disk unit side was prepared, and the control circuit of the above-mentioned power consumption adjustable circuit is established in the above-mentioned body side of optical disk application equipment.

[0013] for this reason, the power requirement by the side of the body of optical disk application equipment can be eased by restricting the drive output to the spindle motor at the time of the rotation standup of the spindle motor of the order at the time of access of an optical disk unit, and (or) rotation falling.

[0014]

[Example] Hereafter, one example of this invention optical disk unit and its application equipment is explained with reference to a drawing. Drawing 1 shows the configuration of one example of this invention optical disk unit. In drawing 1 , 10 is optical disks, such as a magneto-optic disk, and this optical disk 10 rotates with a spindle motor 11.

[0015] An optical disk 10 is met and an optical pickup 12 is arranged. An optical pickup 12 irradiates a laser beam at an optical disk 10 because the laser diode (not shown) which constitutes an optical pickup 12 drives by the laser drive circuit 16. The reflected light is changed into an electrical signal, and is supplied to the RF circuit 13 and the servo circuit 14 by the optical pickup 12.

[0016] The RF circuit 13 reproduces a clock and data from the RF signal which is an electrical signal supplied from an optical pickup 12, and supplies them to a controller 15.

[0017] On the other hand, rotation of a spindle motor 11 is controlled by the spindle servo circuit 20.

[0018] The rotational frequency of the spindle motor 11 is changed into the voltage signal corresponding to a rotational frequency by the rotational frequency detector 21. the voltage signal -- the comparison electrical potential difference Vc -- ** -- it carries out, and is compared with the reference voltage Vr supplied from a microcomputer 26 in the error voltage generating circuit 22, and at least error voltage is supplied to the phase compensating network 23.

[0019] The phase compensating circuit 23 performs phase compensation from which the servo loop formed by the spindle servo circuit 20 and the spindle motor 11 becomes stability. The output voltage signal e1 of the phase compensating network 23 is supplied to the adjustable gain amplifying circuit 28 which has an operational amplifier 24.

[0020] The adjustable gain amplifying circuit 28 is equipped with the electronic switch 25 of 1 circuit 2 contact connected to the input resistance machine 41 whose resistance is R1, the feedback resistor 43 whose resistance is R3, the feedback resistor 42 whose resistance is R2, and this feedback resistor 42 at a serial in addition to operational amplifier 24.

[0021] The switch 25 is equipped with traveling contact 25a and two stationary contacts 25b and 25c. Stationary-contact 25c is a no connection. Traveling contact 25a of a switch 25 is changed with the mode circuit changing switch 27 inserted between the control signal S1 from a microcomputer 26 and

the microcomputer 26, and the switch 25.
[0022] Traveling contact 27a and stationary-contact 27b of the mode circuit changing switch 27 are connected, when the level of a control signal S1 is "1", a switch 25 is closed, parallel connection of a resistor 42 and the resistor 43 is carried out, when level is "0", a switch 25 is opened and the feedback resistor of the adjustable gain amplifying circuit 28 turns into only a resistor 43.
[0023] In addition, when the mode circuit changing switch 27 is grounded (i.e., when stationary-contact 27c connected with traveling contact 27a in the ground is connected), it remains being in the condition that the switch 25 was opened, and this mode is called maximum-electric-power mode. The time of the mode circuit changing switch 27 being connected to the microcomputer 26 side is called power-restrictions mode.
[0024] The output voltage signal e2 of the adjustable gain amplifying circuit 24 is changed into a current signal i1 by the current amplification circuit 27 which constitutes a drive circuit, and is supplied to a spindle motor 11. It is made, as for the spindle servo circuit 20, for rotation of a spindle motor 11 to turn into fixed rotation. Here, the output form of the current amplification circuit 27 is the complementary output of a power transistor as illustrated in the block. The rotational frequency of a spindle motor 11 is determined by the magnitude of the reference voltage Vr supplied to the error voltage generating circuit 22 from a microcomputer 26.
[0025] A microcomputer 26 performs the monitor and control of the condition of the servo circuit 14 and the laser drive circuit 16, and communicates with a controller 15 while it performs change control (in this case, closing motion control) of a switch 25 with a control signal S1. In addition, the mode circuit changing switch 27 may be changed manually, and may be changed with a microcomputer 26. You may make it change by the controller 15. The program stored in a microcomputer 26 may be substituted for the mode circuit changing switch 27.
[0026] A controller 15 is connected to the host computer which is not illustrated through a SCSI interface etc.
[0027] Next, actuation of the above-mentioned example is explained.
[0028] First, maximum-electric-power mode (mode in which the switch 27 was grounded and the switch 25 was opened) is explained.
[0029] If an initiation instruction is published from a controller 15, a microcomputer 26 will supply the predetermined reference voltage Vr to the servo circuit 14. After actuation of the spindle servo circuit 20 is started by supply of this reference voltage Vr and the rotational frequency of a spindle motor 11 increases to some extent, the laser diode under optical pickup 12 emits light by the laser drive circuit 16, and a laser beam is irradiated by the optical disk 10. In addition, the increment in a rotational frequency of a spindle motor 11 Measure the increment property beforehand and it stores in ROM in a microcomputer 26 (not shown). A circuit (not shown) may detect indirectly (in the case of this example). the time check in a microcomputer 26 -- Or you may make it supervise the comparison electrical potential difference Vc which is the output of the rotational frequency detector 21 with a microcomputer 26. Or it may be made to carry out the number of unit hour meters of the pulse signal of the rotation sensor (not shown) attached in the revolving shaft of a spindle motor 11 in same axle with a microcomputer 26.
[0030] And a microcomputer 26 performs well-known servo control (the so-called tracking servo and the so-called focus servo) to an optical pickup 12 through the servo circuit 14. In the condition that the servo started, playback of a clock and data is performed based on the RF signal read from the optical disk 10 to the radical of control of a controller 15 by the optical pickup 12 in the RF circuit 13.
[0031] On the other hand, if stop instruction is published from a controller 15, after a microcomputer 26 controls the servo circuit 14 and stops servo actuation, it will stop luminescence of a laser diode through the laser drive circuit 16. Then, reference voltage Vr is made into a zero value, and rotation of a spindle motor 11 is stopped.
[0032] In order to shorten time amount (henceforth [it falls if needed and] time amount) until it makes time amount (henceforth build up time if needed) until it makes the rotational frequency of a spindle motor 11 into predetermined constant value from a zero value at the time of the rotation standup of a

spindle motor 11, and the rotational frequency of a spindle motor 11 into a zero value from predetermined constant value here as much as possible, it is required to drive a spindle motor 11 by maximum capacity.

[0033] Drawing 2 A expresses the change property 50 of power consumption when not restricting power consumption at the time of maximum-electric-power mode, i.e., a rotation standup, etc. (when [several 2] explaining later). In this example, +12V are used as supply voltage and it turns out that build up time TR1 is TR1** 1 second. The consumed electric current in the meantime is about 1A. In addition, after progress of build up time TR1, about 1/of power consumption is set to 10 (the consumed electric current is about 0.1A).

[0034] In this maximum-electric-power mode, the power consumption of the whole optical disk unit and generation of heat become max in the time of a rotation standup etc. In addition, the great portion of power consumption is consumed by the power circuit containing the current amplification circuit 27, a spindle motor 11, the power transformer that is not illustrated. Generation of heat is also mostly generated in proportion to power consumption.

[0035] Then, in drawing 1 , it can be made to carry out by carrying out adjustable [of the gain of the adjustable gain amplifying circuit 28] adjustable [of the current value of the current signal i1 supplied to a spindle motor 11 from the current amplification circuit 27 at the time of the rotation standup of a spindle motor 11, and rotation falling by the control signal S1 from the adjustable gain amplifying circuit 28, SUITSU 25, and a microcomputer 26]. That is, the power consumption adjustable circuit is formed by the microcomputer 26, the switch 27, and the adjustable gain amplifying circuit 28.

[0036] Next, the power-restrictions mode which carries out adjustable [of the gain of the adjustable gain amplifying circuit 28] is explained. In this case, a switch 27 is connected to a microcomputer 26 side.

[0037] In this power-restrictions mode, level of the control signal S1 supplied to a switch 25 from a microcomputer 26 at the time of the rotation standup of a spindle motor 11 and rotation falling is set to "1", and traveling contact 25a and stationary-contact 25b are connected.

[0038] Therefore, in this case, gain G1 of the adjustable gain amplifying circuit 28 is made small, as shown in several 1. In addition, since it falls with the time of a rotation standup, the level of a control signal S1 returns to "0" at the times other than the time and a switch 25 is opened, gain G2 becomes large as shown in several 2. By enlarging gain G2, the so-called spindle servo of a spindle motor 11 can be performed at a high speed at the times of access of an optical disk 10, such as at the time of R/W etc. In addition, rotation falling time amount until it becomes a halt (or rotational frequency near a halt) from build up time and a fixed rotational frequency until rotation of a spindle motor 11 turns into fixed rotation A circuit may detect indirectly (in the case of this example). beforehand -- measuring -- the time check in a microcomputer 26 -- Or you may make it supervise the comparison electrical potential difference Vc which is the output of the rotational frequency detector 21 with a microcomputer 26. Or it may be made to carry out the number of unit hour meters of the pulse signal of the rotation sensor (not shown) attached in the revolving shaft of a spindle motor 11 in same axle with a microcomputer 26.

[0039]

[Equation 1] G1=R2, R3/R1 (R2+R3)

[0040]

[Equation 2] G2=R3/R1[0041] Drawing 2 B shows the property 51 of the power consumption at the time of restricting power consumption (in the case [A switch 25 "close"] of several two) corresponding to drawing 2 A at the time of a standup etc. Thus, although build up time doubles [about] to build-up-time TR2** 2 seconds when power consumption is restricted, power consumption in the meantime decreases in abbreviation one half (as the consumed electric current, it is 0.5A). In addition, power consumption is set to the same 0.1A as drawing 2 A after falling time amount TR2 progress.

[0042] Thus, according to the above-mentioned example, adjustable [of the output of the current signal i1 from the current amplification circuit 27 to a spindle motor 11] is carried out, and it is made to carry out adjustable [of the power consumption] by connecting the switch 25 for a gain change to the adjustable gain amplifying circuit 28 which constitutes the drive circuit which drives a spindle motor 11, and changing this switch 25 to it.

[0043] for this reason, it becomes possible to make adjustable power consumption at the time of the rotation standup of a spindle motor 11, and (or) rotation falling, and connection of an optical disk unit becomes easy to the various systems by which a power supply differs from cooling conditions.
[0044] Although power is supplied to an optical disk unit from the power source of the body of a personal computer when connecting with a personal computer by using optical disk units, such as a magneto-optic disk, as external storage, if it explains still more concretely, the power source for the exteriors of the personal computer of a desktop is about [1-2A] small capacity for example, with +12V power source, and usually needs to make power consumption small as much as possible from the power supply and the field of generation of heat. Moreover, in such a system, the build up time and falling time amount (stop time) of a spindle motor 11 do not become a problem like it as compared with systems, such as a jukebox.
[0045] Therefore, in connecting with such a personal computer, by connecting a switch 27 to a microcomputer 26 side, and controlling the level of the output-control signal S1 of a microcomputer 26, it starts and restricts the power consumption at the time and the time of falling.
[0046] In allowances' being in a power source like systems, such as a jukebox or an autochanger, on the other hand and also connecting a cooling system to powerful equipment (it incorporates) Ground the switch 27, or the control signal S1 of a microcomputer 26 is always made into "0" level (when a switch 27 does not exist). What is necessary is a switch's 25 opening wide, and the gain of the adjustable gain amplifying circuit 28 operating by max therefore, and making it a spindle motor 11 operated [just] by capacity max.
[0047] Drawing 3 shows the configuration of the example of this invention optical disk application equipment to which the optical disk unit was connected as external storage. In drawing 3 , 51 is the optical MAG drive including the configuration of the optical disk unit shown in drawing 1 , and this optical MAG drive 51 is connected to the body 53 of a computer of a computer apparatus 52 through the telecommunication cable 54. Transmission and reception of the body 53 of a computer and a signal are performed through this telecommunication cable 54.
[0048] Moreover, the power cable 55 of the optical MAG drive 51 is inserted in the service plug socket which a computer apparatus 53 does not illustrate. Power is supplied to the optical MAG drive 51 through a service plug socket. In addition, the mode circuit changing switch 27 (refer to drawing 1) is beforehand connected to the microcomputer 26 side.
[0049] The computer apparatus 52 is equipped with the input units 58, such as a monitor 57 and a keyboard, in addition to body of computer 53.
[0050] In the example of drawing 3 , when the controller 15 (refer to drawing 1) in the optical MAG drive 51 and the control circuit within the body 53 of a computer (not shown) are connected and a starting instruction of the optical MAG drive 51 is published from the body 53 of a computer apparatus, i.e., the above-mentioned control circuit, the instruction is supplied to a microcomputer 26 through the controller 15 while it is supplied to a controller 15.
[0051] In this case, a microcomputer 26 controls the level of a control signal S1, by performing the above-mentioned power [start and] limiting action at the time and the time of falling, the power consumption at the time of that standup and falling would come to be shown in drawing 2 B, and the power-source current supplied to the optical MAG drive 51 through a power cable 55 from the body 53 of a computer will be restricted.
[0052] Thus, by controlling, even if it connects the optical MAG drive 51, a fear of exceeding the external power capacity specification of the computer apparatus 52 which constitutes optical disk application equipment completely disappears.
[0053] Thus, when starting rotation of the spindle motor 11 of the optical MAG drive 51 from the body 53 of a computer according to the example of drawing 3 , In case rotation is brought down, or at the time of the rotation standup of the spindle motor 11 of the optical MAG drive 51, and falling Since the power consumption adjustable circuit which has the prepared adjustable gain amplifying circuit 28 and switch 25 in the optical MAG drive 51 is operated by the power-restrictions side An optical MAG drive is connectable with the desktop computer of relaxation, paraphrasing ****, and usually marketing of the

power requirement of a computer apparatus 52 etc. as it is.
[0054] Drawing 4 shows the configuration of other examples of this invention optical disk unit. In addition, in drawing 4 , the same sign is attached to what was shown in drawing 1 , and a corresponding thing, and the detailed explanation is omitted.
[0055] In the example of drawing 4 , the configuration of the spindle servo circuit 20 is changed into the spindle servo circuit 65 as compared with the example of drawing 1 . If it says in more detail, the configuration of the adjustable gain amplifying circuit 28 is changed. That is, a switch 66 is formed in the output side of the phase compensating circuit 23, and the amplifying circuit 67 of immobilization of gain is established in the opposite side of the switch 66. And in order to make adjustable gain actuation of the adjustable gain amplifying circuit 28 perform, the switch 66, the pulse generating circuit 68, and negative input OR circuit 69 are newly formed.
[0056] The level of the output-control signal S2 responds, and a switch 66 is changed. The level of the output-control signal S2 is an output level of negative input OR circuit 69 with the control signal S1 which are the output of a pulse generating circuit 68, and the output of a microcomputer 26.
[0057] When the output-control signal S2 of negative input OR circuit 69 is level "1", a switch 66 is changed so that at least a resistor 41 may be connected to the phase compensating-circuit 23 side, and it is changed at the time of level "0" so that it may connect with a ground.
[0058] A pulse generating circuit 68 is an oscillator circuit which generates the repeat pulse signal of a short period as compared with the rotation build up time and falling time amount of a spindle motor 11.
[0059] Thus, in the example of drawing 4 constituted, in power-restrictions mode (mode in which a switch 27 is connected to a microcomputer 26), since the control signal S1 from a fixed period and a microcomputer 26 is set to level "1" at the time of the rotation standup of an optical disk 10, and rotation falling, in that case, the output signal of a pulse generating circuit 68 is reversed and outputted by negative input OR circuit 69, and is supplied to a switch 66. Therefore, as for the level of a control signal S2, "1" and "0" are repeated for the level of a control signal S1 by the period of "1", and at least a switch 66 is changed to a phase compensating network 23 or ground side.
[0060] Therefore, in this case, from the power amplification circuit 27, the consumed electric current corresponding to current signal i2 outputted comes to be shown in drawing 2 C, and comes to flow intermittently. Therefore, mean power becomes being the same as that of drawing 2 B, and power consumption is restricted. In addition, since the control signal S1 from a microcomputer 26 has "0" level into the normal operation for holding the rotational frequency of a spindle motor 11 to constant value, it is the same that at least the resistor 41 remains connected to the phase compensating network 23 side as the above-mentioned example of drawing 1 explained.
[0061] In this example of drawing 4 , the power consumption adjustable circuit is formed with a pulse generating circuit 68, negative input OR circuit 69, and a switch 66.
[0062] Thus, according to the example of drawing 4 , since current i2 supplied to a spindle motor 11 falls with the time of the standup of rotation of a spindle 11 and sometimes comes to be supplied intermittently, it can fall with the time of the standup of these rotations, and can sometimes restrict power consumption. For this reason, connection of an optical disk unit becomes easy to the various systems by which a power supply differs from cooling conditions in changing a switch 27 if needed and operating a power consumption adjustable circuit.
[0063] In addition, it is also possible to incorporate the optical disk unit shown in this example of drawing 4 as optical MAG drive 51 of the example of drawing 3 .
[0064] Moreover, as for this invention, it is needless to say that various configurations can be taken, without deviating from the summary of not only the above-mentioned example but this invention.
[0065]
[Effect of the Invention] As explained above, according to this invention optical disk unit, adjustable [of the drive output from a drive circuit to a spindle motor] is carried out, and it is made to carry out adjustable [of the power consumption] by connecting a switch to the drive circuit which drives a spindle motor, and changing this switch.
[0066] for this reason, it becomes possible to make adjustable power consumption at the time of the

rotation standup of a spindle motor, and (or) rotation falling, and connection of an optical disk unit becomes easy to the various systems by which a power supply differs from cooling conditions.
[0067] moreover, according to the application equipment of this invention optical disk, the power consumption adjustable circuit which carries out adjustable [of the drive output to the above-mentioned spindle motor at the time of the rotation standup of a spindle motor and (or) rotation falling], and carries out adjustable [of the power consumption] to an optical disk unit side was prepared, and the control circuit of the above-mentioned power consumption adjustable circuit is established in the above-mentioned body side of optical disk application equipment.
[0068] for this reason, the power requirement by the side of the body of optical disk application equipment can be eased by restricting the drive output to the spindle motor at the time of the rotation standup of the spindle motor of the order at the time of access of an optical disk unit, and (or) rotation falling.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of one example of this invention optical disk unit.
[Drawing 2] A is a diagram with which explanation of the example of drawing 1 and the example of drawing 4 of operation is presented. B is a diagram with which explanation of the example of drawing 1 of operation is presented. C is a diagram with which explanation of the example of drawing 4 of operation is presented.
[Drawing 3] It is the diagram showing the configuration of one example of this invention optical disk application equipment.
[Drawing 4] It is the block diagram showing the configuration of other examples of this invention optical disk unit.
[Description of Notations]
10 Optical Disk
11 Spindle Motor
20 Spindle Servo Circuit
25 Switch
28 Adjustable Gain Amplifying Circuit
51 Optical MAG Drive

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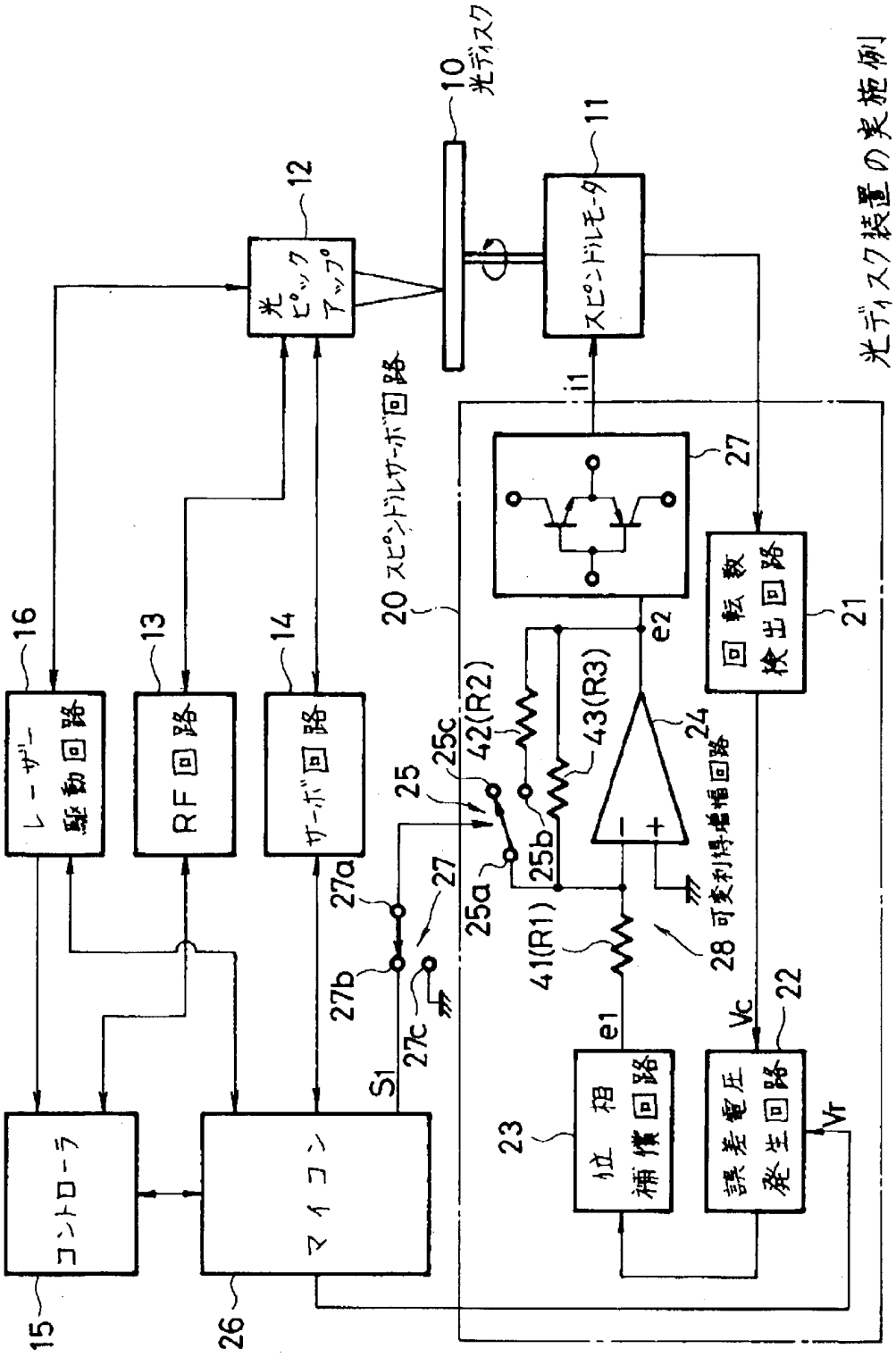
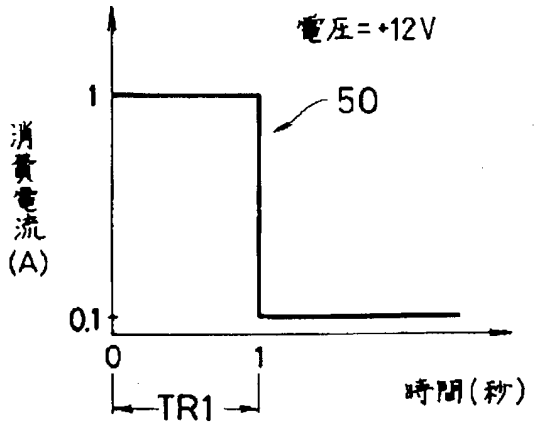
DRAWINGS

[Drawing 1]

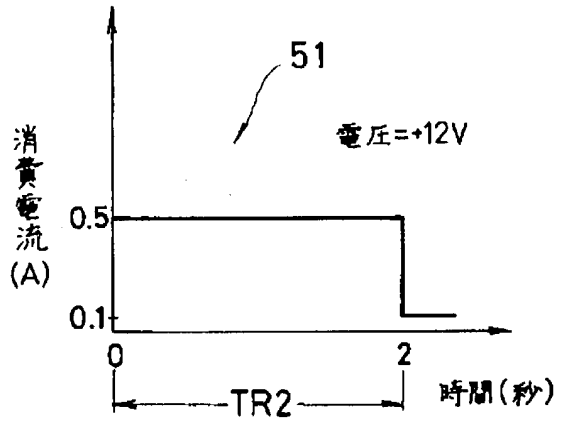

光ディスク装置の実施例
10 光ディスク
11 スピンドルモータ
12 光ピックアップ
13 RF回路
14 サーボ回路
15 コントローラ
16 レーザー駆動回路
20 スピンドルサーボ回路
21 回転数検出回路
22 誤差電圧発生回路
23 位相補償回路
24 可変利得増幅回路
25 25a 25b 25c
26 マイコン
27 27a 27b 27c
28
41(R1) 42(R2) 43(R3)
e1 e2
i1
Vc Vr
S1

[Drawing 2]

A 消費電力非制限



B 消費電力制限



C 消費電力制限

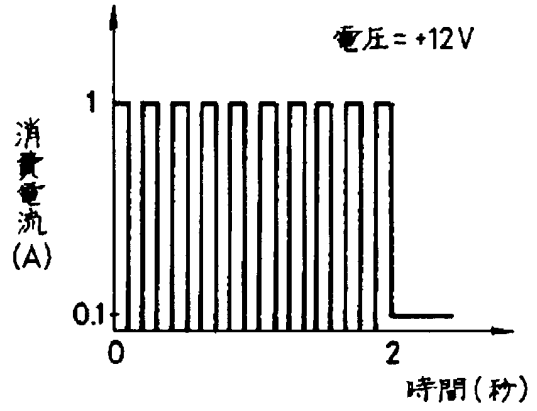
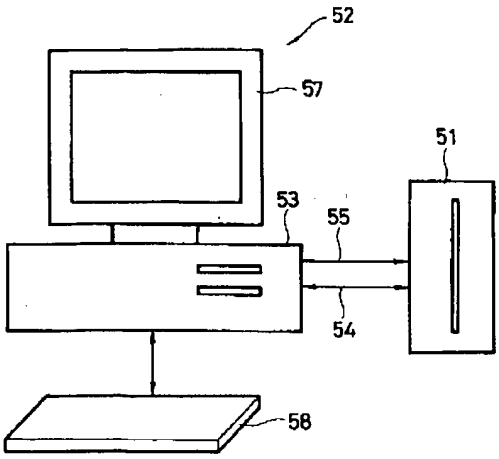


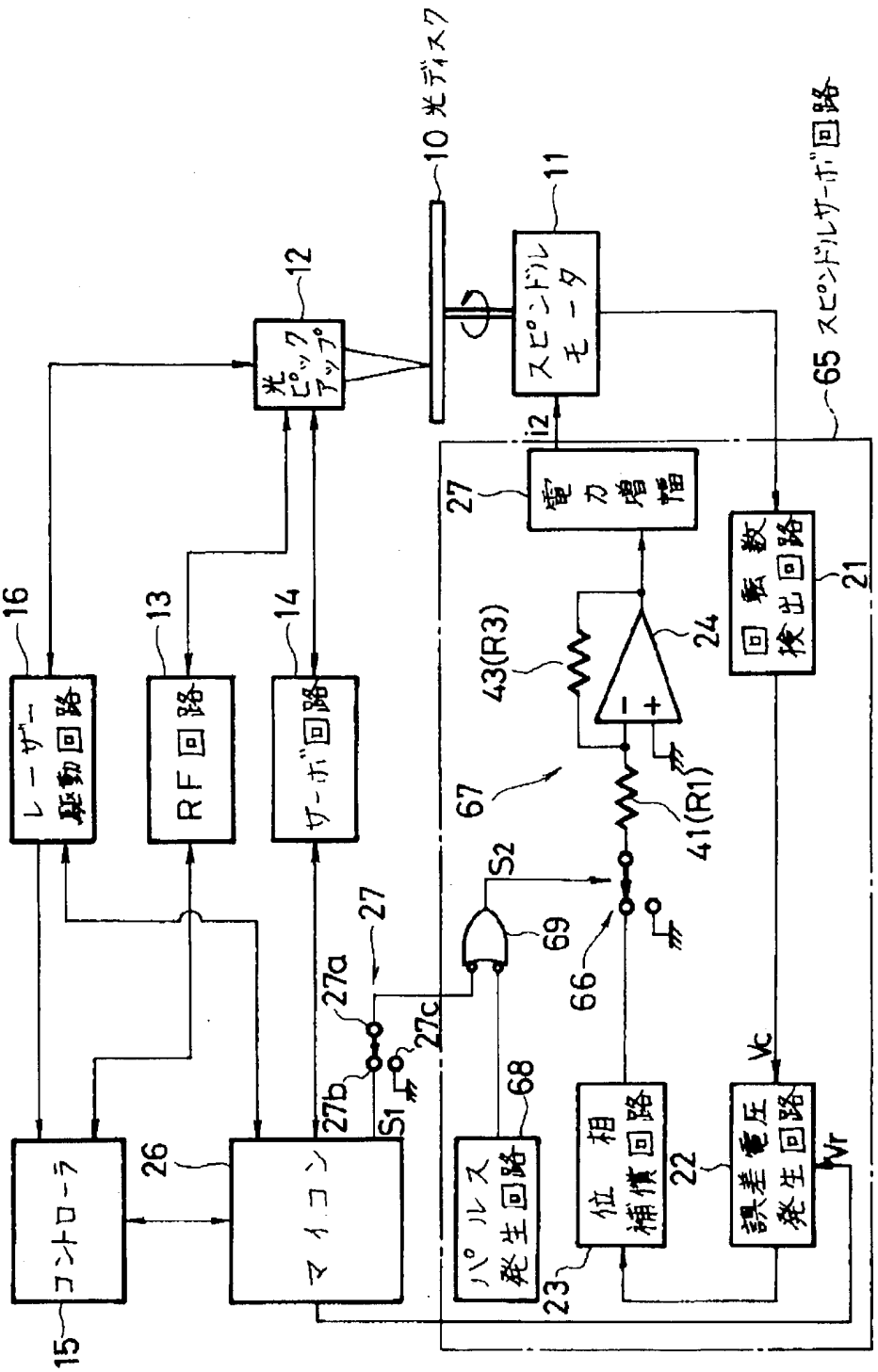
図1例の動作(A.B)と図4例の動作(A.C)

[Drawing 3]



光ディスク応用装置の実施例

[Drawing 4]



光ディスク装置の他の実施例

[Translation done.]